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# ***JPRS Report***

# **Science & Technology**

***Central Eurasia:  
Life Sciences***

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# Science & Technology

## Central Eurasia: Life Sciences

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**Theoretical Evaluation of Risk of Decompression Illness in Single-Stage Pressure Differentials**

927C0382D Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 321 No 6, Dec 91 (manuscript received 25 Sep 91) pp 1291-1295

[Article by V. P. Nikolayev, Biomedical Institute, Moscow; UDC 612.014.461+612.27+616.001.1]

[Abstract] The objective of this study was to determine theoretically the structure and quantitative characteristics of the function of the risk of developing illness with respect to parameters of decompression with single-stage pressure differentials from the position of an approach to predicting the safety of decompression based on mathematical simulation of the development and growth of gas bubbles in the body. An analysis of the formation and evolution of gas bubbles in the body revealed that in single-stage decompression embolization of any tissue may be identified with the process of synchronous growth and subsequent resorption of the bubbles that form at the moment the pressure differential is completed and that remain *in situ* with their concentration

proportional to the initial gradient of supersaturation of the tissue with gas. The uncertainty of the true probabilities of the display of decompression illness at actual pressure differentials makes it impossible to plot theoretical curves for the risk of developing this illness. However, abundant data on the tolerance of different pressure differentials at different levels of physical activity can be used to construct statistical approximations. The results showed that for all trips of Soviet cosmonauts into outer space in which they were subjected to decompression from the pressure level in the space ship or station (1 abs. atm.) to the level of operating pressure in the space suit (0.4 abs. atm.), no display of decompression illness symptoms was noted. Such a striking difference in the tolerance of decompression in actual outer space activity and the simulation of it on earth is attributed to a decrease in the effectiveness of mechanisms for forming gas bubbles in the cosmonaut's body due to limitations in movement of the limbs in the space suit and also the partial desaturation of the body from nitrogen. Figures 2; references 8: 6 Russian, 2 Western.

**Nutritional Characteristics of Newly Developed  
Sherdor Wheat**

927C0346A Tashkent UZBEKSKIY  
BIOLOGICHESKIY ZHURNAL in Russian No 6,  
Nov-Dec 91 (manuscript received 18 Apr 90) pp 25-28

[Article by T.Kh. Khodzhakulov, Samarkand Agricul-  
tural Institute; UDC 636.085:633.11]

[Abstract] Chemical analysis was conducted on the Sherdor wheat variety newly released for use in Uzbekistan to assess its suitability for fodder. A comparison with rye Vakhshskaya-116, the current standard fodder, showed that Sherdor either is equivalent or exceeds the rye crop in protein, lipid, and phosphorus content, depending on the part of plant under analysis. Accordingly, Sherdor wheat deserves recommendation for cultivation to increase the supply of fodder in Uzbekistan, with breeding conducted to further enhance leaf production. Tables 2.

**Karakalpak Population Genetics: Correlation and Variability of Anthropometric Traits in Neonates in Cotton Growing and Nongrowing Regions**

927C0346B Tashkent UZBEKSKIY  
BIOLOGICHESKIY ZHURNAL in Russian No 6,  
Nov-Dec 91 (manuscript received 27 Dec 90) pp 57-60

[Article by P.I. Tashkhodzhaev, B.A. Abdullayev and V.A. Rasulova, Tashkent Order of the Red Banner of Labor State Medical Institute, Ministry of Health, Uzbekistan; UDC 575.11.575.591]

[Abstract] Comparative anthropometric analysis was conducted on neonates in Karakalpakia in a cotton-growing region (Amudar Rayon) and in a non-growing region (Muynay Rayon). The parameters under study included weight, head and chest circumference, blood group, and maternal data (age, numbers of pregnancies, births, abortions, miscarriages). On balance, greater degrees of asymmetry were found in the Amudar children. Average values of anthropometric parameters in the Muynay children showed insignificant dispersion in

the anthropometric parameters, whereas in Amudar the statistical dispersions (10-25 percent) were significant. These observations underscore the risk factors involved in areas with extensive use of agricultural chemicals. Tables 1; references 3: Russian.

**Percent of Babies in Arkhangelsk Oblast Under-Developed Is 95**

LD2005221992 Moscow Russian Television Network  
in Russian 1900 GMT 19 May 92

[From the "Vesti" newscast]

[Text] Twenty years of research by doctors from Arkhangelsk who have been studying the impact of the environment on the human organism has been completed. As a result of nuclear tests in Novaya Zemlya, pollution of the seas, and the appearance of an ozone hole over the area, Arkhangelsk Oblast has become an ecological disaster zone. Ninety-five percent of children born here are weak and physically under-developed. There has been a five-fold increase in the number of oncological ailments.

**Molecular Genetics of (AT)<sub>26</sub> Repeats in Barley Genome**

927C0344A Minsk in VYESTSI AKADEMII NAVUK  
BSSR: SYERYYA BIYALAHICHNYKH NAVUK  
in Belorussian No 4, Jul-Aug 91 (manuscript received  
21 Feb 91) pp 75-79

[Article by N.A. Kartel and G.Z. Yermak, Institute of  
Genetics and Cytology, Belorussian SSR Academy of  
Sciences; UDC 575.113]

[Abstract] Molecular analysis was conducted on (AT)<sub>26</sub> tandem repeating sequences in the barley genome and that of related species to ascertain possible taxonomic and functional significance. The results revealed considerable polymorphism in (AT)<sub>25</sub> flanking sequences in the various *Hordeum* species and genera in the Poaceae family, but conservatism in *H. vulgare*. Accordingly, these tandem repeats, located in an extended intron, should be useful in identification of barley species and in studies on phylogenetic relationships in the Graminae family. It may also be assumed that such unique sequences alter DNA conformation and, hence, impact on function (possibly regulation of gene expression). Figures 3; tables 1; references 19: 1 Belorussian, 5 Russian, 13 Western.

**Elevated Background Radiation and Callus Formation by Barley Embryos**

927C0344B Minsk in VYESTSI AKADEMII NAVUK  
BSSR: SYERYYA BIYALAHICHNYKH NAVUK  
in Belorussian No 4, Jul-Aug 91 (manuscript received  
28 Jan 91) pp 106-109

[Article by M.V. Roshchenko and T.F. Sosnovskaya,  
Institute of Experimental Botany imeni V.F. Kuprevich,  
Belorussian SSR Academy of Sciences; UDC 581.143.6]

[Abstract] Zhodinskiy-5 barley variety was tested for callusogenesis and rhizogenesis from embryos in relation to the background levels of ionizing radiation prevalent in the region of plant growth in the vicinity of Chernobyl. Correlation of the percentage of explants producing rootlets vs. background radiation revealed that plants exposed to 7 Ci displayed maximum rootlet formation (70 percent) vs. ca. 20 percent for control plants. The corresponding values were 39 and 42 percent for plants exposed to 40 and 60 Ci, respectively. Concomitantly, highest rate of callus formation (100 percent) was noted in control plants and the lowest rate (ca. 60 percent) in plants exposed to 15 Ci; a second peak (ca. 80 percent) was noted in the 40 Ci plants. In addition, whereas calluses derived from control plants contained ca. 5 µg/g of DNA and RNA, the concentrations were three- to four-fold greater in calluses derived from plants exposed to a 7 Ci background. The concentrations of the nucleic acids in calluses derived from plants exposed to 15 Ci were slightly below control levels. Accordingly, background radiation was shown to affect plant capacity for callus and root generation in a dose-dependent manner. Figures 2; references 6: 3 Russian, 3 Western.

**St. Petersburg Hospital Stops Accepting Patients**  
*927C0384D Moscow PRAVDA in Russian 5 Mar 92 p 2*

[Article by Besik Pipiya (special PRAVDA correspondent), St. Petersburg: "It Is Too Soon for Us To Die...."]

[Text] After close to 100 years of existence, the hospital of the St. Petersburg Medical Institute closed its admitting department. Nikolay Vavilov, chief physician of the institute's clinic, was compelled to endorse an order to stop admitting patients. The reason was the lack of drugs and funds to feed the patients.

The former First Leningrad Medical Institute was under the jurisdiction of the former USSR Ministry of Health. Upon the demise of the Union, the medical institution was placed under the management of the Russian Ministry of Health in December of last year, but little is mentioned by the successor in documents. Even a "step-father" should be concerned about the life of its offspring. And it appears that the Russian government has forgotten about this "trivial item."

I asked the pro-vice-chancellor for medicine at the medical institute, G. Nikitin: "How much money do you need for one month? Perhaps sponsors could be found, and in the meantime the Russian Ministry of Finance will clarify the causes of what has happened?"

He replied: "I would not attempt to quote an exact figure. Judge for yourself: 80 percent of the items on the drug list cost 4-5 times more now. There are contractual fixed prices for the remaining 20 percent."

Needless to say, at least it is not the physician's task to predict what the economic situation will be tomorrow. For the time being, in the period of formation of the Russian government, it appears that one will have to arm oneself with the treating method discussed in the comedy, "The Inspector-General." N. Gogol's hero states that "we do not use expensive drugs. If the patient dies, he dies, and if he recovers, he recovers...."



### Influenza A Surface Antigens as Immunomodulators in Experimental Staphylococcal Infections

927C0348B Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian* No 6, Apr 91 (manuscript received 08 Sep 90) pp 53-56

[Article by V.F. Lavrova, N.G. Orlova, G.L. Ratgauz, L.P. Khodakova, L.A. Mazhul, G.B. Kirilicheva, M.S. Solovyeva, O.N. Ageyeva and A.K. Akatov, Scientific Research Institutes of Viral Preparations and of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Sciences, Moscow; UDC 615.371:578.832.1]-036.8[616.24-002-022.7:579.861.2]

[Abstract] Modulating effects of influenza on bacterial infections led to an assessment of the impact of a neuraminidase/hemagglutinin complex (NHC) derived from influenza A viruses—A/PR/8/34(H1N1) or A/Krasnodar/101/59(H2N2)—on acute pulmonary staphylococcal infection in mice. The experimental model utilized 16-18 g female BALB/c mice pretreated intranasally with seven µg per mouse of NHC and challenged 72 hours later intranasally either with  $2.5 \times 10^9$  or  $5 \times 10^9$  *Staphylococcus aureus* Wood-46 cells per mouse. The respective mortality rates in untreated control mice were 45 and 70 percent. These figures were reduced 2.6- to 4-fold and 1.2- to 2.3-fold, respectively, with H1N1 and H2N2 NHC. In addition to greater efficacy in reducing mortality, the H2N2 NHC was also more efficient in inhibiting cytotoxicity of natural killer cells than H1N1 NHC and in enhancing blast transformation of splenic lymphocytes. Finally, while H1N1 NHC pretreatment led to a reduction of macrophages in bronchoalveolar lavage fluids, H2N2 NHC induced an increase in the macrophage counts. Accordingly, NHC was shown

to protect mice against pulmonary staphylococcal infections via modulation of the immune system. However, the effects of NHC were highly serotype dependent. Figures 3; tables 1; references 15: 6 Russian, 9 Western.

### Preparation and Characterization of Liposomes Bearing External Anti-Interferon Antibodies

927C0348C Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian* No 4, Jun 91 (manuscript received 04 Nov 89; in final form 17 Mar 90) pp 65-68

[Article by V.A. Chernyavskiy, S.V. Zibrin and A.D. Lebedev, All-Union Scientific Research Institute of Highly Purified Biopreparations, Leningrad; UDC 616.153.962.4-097-078.33]

[Abstract] Studies were conducted on the efficiency with which immunoliposomes bearing monoclonal IgG1 antibodies (MA) against interferon- $\alpha$  (IFN) bind the antigen. The MAs were conjugated to the bilayer lipid membranes via palmitic acid by the method of Huang et al. [J. Biol. Chem., 235:8015, 1980], resulting in the binding of three to four IgG1 molecules per liposome. IFN absorption to the immunoliposomes exceeded 2- to 3-fold that to control liposomes, but fell short of saturation as indicated by molar IFN:MA ratios of 0.28 to 0.86. Sandwich studies with another specific MA (MA<sub>2</sub>) added to the system to create liposome-MA-IFN-MA<sub>2</sub> complexes showed that 14 molecules of secondary MA<sub>2</sub> were bound per 100 molecules of the liposome-bound primary MA via the IFN link. Poor formation of the complexes was attributed to weak hydrophobic attachment of the primary IgG1 molecules to the liposomes which were easily disrupted, as well as their burial in liposome surface and inaccessibility for reaction with IFN. Figures 3; tables 2; references 6: 2 Russian, 4 Western.

### **Russian Health Minister Denies Retirement Rumors**

927C0384A Moscow ROSSIYSKAYA GAZETA  
in Russian 19 Mar 92 1st ed. p 5

[Article by Olga Plakhotnikova: "What They Say and What Is True—Retirement Rumors Are Exaggerated"]

[Text] I went to Andrey Vorobyev, health minister of Russia, to learn from him personally whether it is true that he plans to retire; such rumors embellished with details apparently originated on the upper levels of power and have already reached hospitals and polyclinics. It seems that they are strongly prompted as well by the critical "health status" of medicine itself, which is apparent to the naked eye.

Andrey Ivanovich [Vorobyev] stated "My former colleagues have already congratulated me for my bold decision to return from bureaucratic activities to medical work. (For the last four years I have been director of the All-Union Hematological Research Center.) However, I have no intentions of retiring."

[Plakhotnikova] Do you concur with the opinion that our health care system is reaching an end, that it can collapse any day now?

[Vorobyev] There is absolutely no breakdown of health care. It could collapse only because it is financed to less than fifty percent. There is a shortfall of 23 billion for the first quarter. For us, 1992 is a critical year; it would take a few months to destroy the system.

How can I prove that there is no collapse? Here, for example, is one of the deciding indicators—infant mortality. It has declined from 18.9 to 17.4/1000 births from 1988 to 1990. The figure was 16.8 for 11 months of last year.

Mean life expectancy has increased by 1.5 years and reached 69.9 years: This is 64 years for men and 74 for women. Yes, we do have one of the poorest indicators in Europe, but still, there has been some obvious progress. There has been virtually no change in health status of the public within the last year. You may ask the reason for this, since social problems affect health. The answer is that the health care system has not collapsed.

If it receives sufficient funds, if we succeed in convincing local authorities to provide grants for medicine, and if financing will be retained for procurement of drugs, I am sure that we shall stay on our feet.

### **Academician Comments on Drug Shortage**

927C0384B Moscow ZHIZN in Russian 10 Mar 92 p 2

[Article by Irina Krasnopolskaya: "When Will There Be Aspirin in Every Pharmacy? Question Asked of Academician Pavel Sergeyev, Prominent Specialist in Drug Products"]

[Text] [Sergeyev] To be very precise, we are simply not offering treatment at the present time: There is not even a kind word about physicians. Society has become so bitter, people are so angry, and all of mankind has been so consumed by the search for what is scarce that it is difficult to find a kind word. Yet, the situation with drugs is indeed disastrous. Although, do not be surprised that expressly now I have some hope.

[Krasnopolskaya] I was told that you, Pavel Vasilyevich, have passed through all of the power structures, all the way to the top to achieve something. Is this the truth or a legend?

[Sergeyev] It is true. I have been in the apparatus of the former president of the former Union, and that of the Russian president. Together colleagues of mine, academicians Mikhail Davidovich Mashkovskiy and Robert Georgiyevich Glushkov, drafted the ukase of President Gorbachev about supplying drugs to the people of the USSR. We do not know why Mikhail Sergeyevich never examined it, since he used to like to say that it was a fateful decision. In July of last year, I was received in the White House by Ivan Stepanovich Silayev. He proposed that we work together on an ukase. In August I sent him a wire about my agreement to be his adviser on development and introduction of drug products in our country. Work began, but the endless political perturbation in our country slowed it down.

[Krasnopolskaya] What has been concretely accomplished? People are tired of promises.

[Sergeyev] In the first place, a team of scientists has compiled a list of vitally important drugs that must be produced. In the second place, thanks to the Russian deputies, it was possible to establish a committee that will deal specially with questions pertaining to drugs.

[Krasnopolskaya] What about the Pharmaceutical Committee?

[Sergeyev] It is a management body and nothing more. Unfortunately, at a given point in time, there was spontaneous dissolution of this committee and, in spite of our request to the former management of the former USSR Ministry of Health, it could not be revived. It changed into an ordinary bureaucratic entity and is not involved in the supply of drugs. In the third place, a program for drug products has been approved. The Russian government has allocated funds. True, they are not sizable, and only in our domestic currency.

[Krasnopolskaya] But the Russian government has also made a contribution in hard currency for acquisition of new drugs. Or am I mistaken?

[Sergeyev] Yes, it has. But in my opinion some of the hard currency should have been allocated for retooling our own pharmaceutical industry. This was not done; the hard currency is used only to purchase foreign drugs. Of

course, they are needed. But it is equally necessary to improve the domestic pharmaceutical industry—it is on the verge of a standstill.

[Krasnopol'skaya] If that is so, what can all your beautiful programs and documents accomplish? Can you answer this question: When will CIS citizens be able to get at least ordinary, pure, safe aspirin? The kind that is used the world over, but not by us. Will valocordin, analgin, vitamin-enriched eye drops, and other most essential drugs appear in our pharmacies, even at today's insane prices?

[Sergeyev] That is a very difficult question. I realize full well that even the best, the wisest, the most necessary ukases and laws are seldom effective in our country. Will we be an exception? I think not.

[Krasnopol'skaya] Then what grounds do you have to be hopeful?

[Sergeyev] My hopes are generated by the fact that professionals are now involved in solving the problem. Let me cite an example. We have never solved a problem starting from the search for a drug and ending with its use in clinical practice. Now there is an opportunity to do this. For this reason, all of the drugs you listed will become available, unless there are any more social upheavals.

[Krasnopol'skaya] Where will funds be found for them? After all, that same valocordin has to be purchased abroad, and no one will sell it to us for rubles.

[Sergeyev] I am ashamed that the needy have to go to huge expense to obtain the most essential drugs. The high cost of drugs appeared after the democrats came to power. The impression is gained that there are people among the democrats who want to discredit the progressive elements of our life.

This question, the question of life or death of society, must be resolved by a congress of Russian people's deputies and congresses of all CIS states.

### **New Method of Pancreas Surgery**

927C0384C Moscow ROSSIYSKAYA GAZETA  
in Russian 4 Mar 92 p 8

[Article by Boris Samoylov, under the rubric "For the First Time": "Operations Without a Scalpel"]

[Text] Pathology of the pancreas strikes tens, hundreds of thousands of people. For many years the pancreas was a sort of blank spot for surgeons. Contact with a scalpel often led to a tragic ending. It is not in vain that physicians called it the "don't touch" organ.

Sergey Shipovalyants, doctor of medical scientists, has proposed a new conservative method of treating patients, which has no analogues in worldwide practice. It has replaced the scalpel with an ordinary videoscope

that permits "unloading" the pancreas, enabling one to locate the orifice of the pancreatic duct without damaging it.

The new method can be used in the treatment of other organs, for example, the gallbladder.

### **"Baltmed" Health Center Opens**

927C0389A St. Petersburg SMENA in Russian  
29 Jan 92 p 1

[Article by Vladimir Strugatskiy: "Things Are No Worse at Home"; photos [not reproduced] by Aleksandr Belenkiy; first paragraph is SMENA introduction]

[Text] Baltmed, the new center opened this week by the Baltic Maritime Steamship Line [BMP] and St. Petersburg Medical Institute imeni Academician I. P. Pavlov, has challenged official medicine.

In our times, when, it would seem, only stock markets and commercial shops are thriving, there are still people who are also thinking about how to establish medical centers outfitted with equipment of such sophistication as was not even dreamed of, not only by the physicians of Petersburg, but of Russia as a whole.

Again, the seamen of the BMP were lucky. A maritime medical center that can receive up to 600 people per day was opened yesterday on Tsiolkovskiy Street, and it was named Baltmed.

Before the center opened, its general director, Vyacheslav Shelukhin, a physician who has traveled all over the world aboard vessels of the BMP, stated: "When out of the country, to make a creditable showing, our seamen would reiterate: 'Things are no worse at home,' meaning, of course, that shops and apartments, as well as ships and marine hospitals, are much worse at home. Now, they will be able to say, at least about their clinic that 'Things are no worse at home,' without being cunning." We became convinced of the validity of these words as soon as we viewed several offices at the new center. The BMP invested more than a million dollars in the latest, fourth-generation computerized tomograph produced by General Electric, which can permit viewing of such secrets of our body that it is even becoming frightening to expose ourselves to it. For the time being this is the first functional tomograph of such sophistication in Russia, although such equipment has already been acquired for the Kremlin Hospital and Yakutsk gold miners. The chief of the Dutch firm Transvol, Hans Sonneveld, who has been a partner in the BMP for many years, helped acquire the latest gynecological equipment for the new center. In general, there is a long list of manufacturers of the most modern stomatological and urological equipment, as well as special massage tables.... But all this equipment is useless without people who can operate it. The center's management succeeded in finding such physicians. Many of them have undergone training abroad and have been certified by the manufacturers of extremely complex equipment.

In the course of building its medical center for seamen, the BMP as usual had to overcome many obstacles and first of all had to break down the resistance of the Ministry of Health of the former USSR, which did not want to concede that establishment of such an ultra-modern center is beyond the realm of official medicine. Still, the BMP and its physicians decided to offer the challenge and see their project to its conclusion. And, as always, they were victorious. Now they joke that the flowers in the lobby are so beautiful because they were grown on their tears.

Incidentally, the people who supported this idea are both seamen and builders of the steamship line trust, as well as prominent specialists at the Institute imeni Pavlov. They supported it realizing that such a center is needed, not only by the seamen, but also all of Petersburg. In spite of the fact that treatment in such a center costs enormous sums, people with serious diseases and needy residents of Kirovskiy Rayon will be able to undergo testing there....

The maritime medical center on Tsiolkovskiy Street is only the first step taken by the BMP toward developing its major medical complex, with a hospital and polyclinic.

#### **Byelarus Declassifies Chernobyl Health Effects Statistics**

927C0389B Moscow IZVESTIYA in Russian  
16 Apr 92 p 2

[Article by Nikolay Matukovskiy: "Secret Figures Aired in Byelarus"; first paragraph is IZVESTIYA introduction]

[Text] The International Chernobyl Congress has convened in Minsk; it was organized by the Belorussian charitable fund called "For the Children of Chernobyl," along with nongovernment organizations of countries in Europe, America, Asia and Australia.

The general topic of the congress was the world after Chernobyl. The 113 congress participants discussed scientific and global-economic aspects, biomedical and sociopsychological sequelae of the accident. One of the most important topics at the congress was responsibility of the world community for the future of Chernobyl children.

Another event that occurred in the Byelarus parliament is linked expressly to this topic. A. Volkov, people's deputy and candidate of sciences, who is working on problems of radiation medicine, handed out a statement as an official document, which cited some tragic statistics that had been classified until recently.

As of 1 January, there were almost 1700 patients with cancer of the thyroid registered at the republic center, including 55 children six to 12 years of age. In the last few months, 299 more people, including 52 children, were added to the list. This refers to newly detected and

"officially" registered cases. Over the 20-year period preceding the Chernobyl accident, there had not been a single child with cancer of the thyroid, and only five adults with such pathology were reported.

And it turns out, this is only the tip of the iceberg. At the present time, there are almost 200,000 Byelarus children with an enlarged thyroid gland. This means that we should expect a mass scale rise in morbidity.

#### **Sharp Decline in Birthrate Noted**

927C0395A Moscow MEDITSINSKAYA GAZETA  
in Russian 3 Apr 92 p 6

[Article by Ye. Tishuk, candidate of medical sciences, from Moscow, under the rubric "Demographics": "There Are Fewer and Fewer of Us..."; first paragraph is source introduction; last paragraph is source editorial afterword]

[Text] Everything in the world, as we know, is interrelated. And the socioeconomic difficulties that Russia is going through today have undoubtedly left their unhappy mark on the course of population processes.

#### **Crisis or Catastrophe**

The birthrate has dropped substantially (by as much as 12.1 percent)—and dropped in a brief span of time; the death rate has climbed just as rapidly. Last year, that, in turn, led to almost a zero population growth.

Today, we have a birthrate that is lower than ever before in the history of this country, and that crisis is quickly enveloping ever newer territories of Russia. In 1989, a negative population growth was recorded for 10 regions; in 1990, for 21 regions; and in 1991, for 30!

The process of urbanization, which manifests itself in the absolute growth of the urban population and the absolute diminution of the rural population, has continued. The coefficient of urbanization in Russia is the highest today among the republics of the former Soviet Union.

#### **The Price of Urbanization**

An unhappy picture presents itself to demographers and to those who analyze the processes associated with the aging of the population and the build-up in the age structure of the percentage of individuals of retirement age.

It must be said that the whole complex of demographic phenomena, including the migration from village to city and the increase in the number of dependents and disabled persons, is threatening to worsen an already far-from-wonderful situation involving the production of material wealth in this country, not to mention lower the not-so-high productivity of social labor.

The processes associated with the natural movement of Russia's population have their own peculiarities that depend on the type of settlement. The birthrate is higher

in rural areas than in the city, despite the fact that the population in the rural areas has an "older" age structure.

That stems from the fact that the total birthrate coefficient, i.e., the number of children born per woman 15-49 years of age, is half again as high in the village as in the city, or higher. Moreover, among the distinctive features of the birthrate in the village is a lower sensitivity to the adversities of later years. Our villages "owe" their higher mortality figures both to the "older" age structure of the population and to the difference in indices standardized by age.

### Men, As Before, Must Be Taken Care Of

The substantial difference between the mortality rates for men and women—which is a fourfold difference or more among the young and middle working-age groups—is holding steady. A direct consequence of that is the "dying off" of men in the most active age group. As a result, among retirees in 1991, the number of men was almost three times lower than the number of women, especially in rural areas.

Demographers have a concept they call the expected life span. The difference between men and women in Russia in terms of that concept has been growing wider in recent years (and is the highest not only among all the Commonwealth countries, but also in the European region).

Of course, medical-demographic processes differ substantially in the various regions of the country. Underlying those differences is the principle associated with sequence of passage through the phases of demographic transition, whose essence is the lowering of the birthrate and mortality rate, with their values subsequently drawing closer to each other. The pattern associated with populations' going through a demographic transition has the force of a law of natural science.

### The Autonomous Areas Lead

But let's look at what we have today and let's try to generalize the specific results. The territories of Russia are subdivided into several groups. One of those groups, located at the second-phase level, includes republics and oblasts that are characterized by a declining, but still high birthrate, a low death rate, a high growth rate, and a "young" type of population age pyramid. The clearest representatives of that group are, for example, Tuva, Yakutiya, Dagestan, Chechnya, and Kalmykiya.

The third phase of transition is characterized by an already low birthrate, an elevated overall coefficient of death rate, a low growth rate, and a "middle-aged" type of age pyramid. Territories of that type include most of the oblasts and krais of the Central, Northwestern, Central-Chernozem, and Ural economic regions and several other administrative-territorial units.

Sequential passage of populations through the phases of demographic transition is accompanied by a decline in

the level and percentage of exogenous causes of death and a corresponding growth of endogenous and quasiendogenous causes. Just what does the concept of exogenous causes include? It includes infectious and parasitic illnesses associated primarily with external factors; diseases of the respiratory and digestive organs; accidents; and poisonings and traumas. The endogenous and quasiendogenous causes include diseases of the circulatory system and neoplasms. By being aware of those patterns and taking them into consideration, health care organizers can ascertain more clearly the prospects for the development of the sector's services.

### The North—The Environs of Youth

Moreover, migrational flows have formed a number of regions that are typical from the standpoint of population processes. On one hand, there are the regions of the North and the East, which are characterized by the prevalence of a population of working age. On the other hand, there are the central regions, where it is the middle-aged population that, for the most part, is prevalent, especially in the village.

Among the factors determining the status of the medical-demographic processes is also, indisputably, the phenomenon of ethnic differentiation, which shapes, in the words of Prof. V. Dobrovolskaya, the "difference in the cultural norms, traditions, and features of work and everyday living." I can't help but cite some data pertaining to the calculations of that differentiation from the 1979 census for the former Soviet Union as a whole. Those data point to the effect on expected life span for individuals reaching the age of 50 and factors of national affiliation, which, for the Russian population in practically all the CIS countries (except for Belarus), was lower than for the native population. For example, in Azerbaijan, the expected life span for the native population was 64.5 years; whereas for the Russian population, it was 59.0.

In Georgia, those indices (for men) were 66.8 for the native population and 59.4 for the Russian population. In Tajikistan, they were 68.6 and 58.8; in Uzbekistan, 66.6 and 58.3. What is also interesting is that in Russia as a whole, that figure for the native population—that is, for the Russians—is lower than in other states of the CIS, at 58.5 (for men) and 69.4 (for women).

From those and the other data cited above, it's fairly easy to imagine how much timely, important information that demography can put forth, and that includes medical demography, which could be used successfully for evaluating medical-demographic processes in various regions of the CIS, arranging priorities in health care, and improving the organization of health safeguards based on local conditions and features.

Today, our health care sector is moving toward decentralization by inserting market mechanisms on a step-by-step basis, transferring control to lower hierarchical levels, and increasing the independence of local structures. That is why it is the regional approaches that are so



timely in, for example, the study of the state of health of the population, the assessment of new concepts and techniques, and the search for new methods of integration. It must be said that without a serious study of the medical-demographic aspects of development, the society as a whole and the organizers in particular will be unable to find the least painful ways of resolving all the most acute issues of our life. However, until recently, materials pertaining to medical-demographic and medical-geographic research were the property of a rather small circle of specialists and were published primarily in special science journals. We want to break that tradition by periodically publishing in MEDITSINSKAYA GAZETA demography-related articles by domestic and foreign specialists.

### **Medical Insurance Law Implementation Discussed by Insurance Company Official**

927C0398A Moscow NEZAVISIMAYA GAZETA  
in Russian 17 Apr 92 p 6

[Article by Igor Zakharov, Medstrakh Joint Stock Company, under the rubric "Medicine": "Health Care Reform Takes Serious Adjustment: The Euphoria About Insured Medicine Threatens Disaster"]

[Text] On 28 June 1991, the Russian parliament adopted the Law on Medical Insurance for RSFSR Citizens. As of 1 January 1993, that normative act should be fully enacted. Just what does insured medicine hold for us?

As we know, medicine is a form of human activity whose problems almost everyone feels himself competent to judge. And we're seeing a situation like that today. Various groups of the population hold completely different opinions about what, in practical terms, the transition to medical insurance will provide.

Medical people have gotten the idea that insured medicine will be a cure-all for health care. Potential insurers, on the other hand, see the law that has been adopted as merely the juridical foundation for a new tax to be collected from enterprises and citizens. Both opinions suffer from a one-sidedness that comes from the holders of those opinions being poorly informed.

The optimism about insured medicine, which, in the opinion of euphoric writers, is almost a panacea for all the ills of health care, is not well founded. More than anything else, the general procedural principles of the creators of the law summon doubt. For example, in declaring that "risk associated with outlays for the provision of medical care" is the object of medical insurance, the legislator turns the actually existing problem upside-down. Pursuing foreign analogs and traditions of insurance leads in that case to an absurdity: that making the transition to medical insurance requires, initially, the introduction of fee-based medicine—for only with fee-based medicine does the risk of outlays for medical care arise. Alas, what was natural for the health care of Western countries (the re-forming of fee-based medicine into insured medicine) is absolutely impossible in our

situation. We are moving to medical insurance from non-fee-based, state-financed medicine.

In fact, the risk against which it is necessary to insure the health of Russians is organizational and economic. The citizens of our country cannot get the necessary medical care because today's Russian health care sector is incapable of providing it to everyone who needs it. To put it differently, we don't just risk facing medical-service expenditures that are too large—we may also simply fail to receive service of the quality that is needed in connection with a possible health disorder.

Thus, medical insurance in our country must include obligations involving the organization and provision of medical services, and not just obligations involving payment for medical services.

The prospects associated with the formation of a system of medical insurance depend largely on how quickly and effectively we manage to clarify the status, level of competence, and interrelationships of all the subjects of medical insurance. We should admit that in the near future, medical institutions will not all be able to immediately convert to enterprises that trade in medical services, as is required by the law. The legal, organizational, and economic conditions that have come about are not at all favorable to that. Moreover, the uncertain economic situation in Russia is creating natural prerequisites for unequal initial conditions and capabilities of medical institutions to lead to enormous deformations in the existing market of medical care.

Privileged medical institutions that, in a special distribution system for public monies, have received from the public purse the largest appropriations, including hard currency, for the acquisition of equipment, for construction, and so forth, now feel that they don't have to reckon with the contribution made by all the citizens of the country to the current economic well-being of those institutions. Prof. Fedorov and those in his institute, for example, are adamant about privatizing property that came about through unprecedented protectionism in the use of state budgetary funds. Similar dispositions are noted in the environs of the former Fourth Main Administration of the USSR Ministry of Health, which, as we know, was also financed on what were not the usual terms.

If the process of changing the economic status of treatment institutions doesn't take a more civilized and balanced form, we risk finding ourselves in a situation that is more harsh than the one we're in now: We will have to pay for all vitally important and scarce services and only insignificant care performed by lesser-skilled individuals will be free.

In changing over to insured medicine, we also need to re-shape the structure of health care. The polyclinic that we're accustomed to, for example, will be completely inviable in the new economic situation and will be

squeezed out by independent, general-practice physicians. But to date, the number of trained general practitioners is ridiculously low when compared with the predicted need.

In general, one could say that health care is unprepared organizationally, economically, and structurally to work in the environment of medical insurance. If, notwithstanding the circumstances that have actually come about, the introduction of mandatory medical insurance were to be forced in that situation, the system for rendering medical care could collapse.

The situation with the insurance organizations that are springing up is no better. The arrangement for regulating their activity will be determined by a whole array of normative documents that, for now, exist only in draft form. The relationship of medical insurance to the total insurance system has not been determined. Nor is it clear how an insurance company will fulfill its obligations to those it insures if it goes bankrupt.

That bankruptcies are quite likely is evidenced by the fact that no specific mechanism for collecting monies for mandatory medical insurance exists in either the law or in the normative-procedural acts that accompany it. In the current absence of legal boundaries, that will almost certainly lead to insurer-enterprises ignoring the enactment of the law and, with hardly any additional prompting, ridding themselves of their financial funds.

Those hardly represent all the arguments demonstrating that the current concept for the change-over to medical insurance has not been fully worked out. There is no doubt that the existing system of health care must be reformed. But something better must be created, and we must not merely experiment for the sake of experimenting.

The following principles must be incorporated in the reform of health care before any others:

- abandon for the next two or three years the introduction of mandatory medical insurance
- keep the state-budget system as the basis of health care
- determine the contingents and the list of health disorders and medical services that will be paid for with the budget; determine the procedures for rendering care to the unemployed and to staff members of state organizations
- adopt the necessary additional acts involving medical insurance and adjust the existing acts, plus set up a material-technical base for mandatory insurance
- separate voluntary and mandatory insurance, as well as commercial and noncommercial health care, by means of gradually reforming the existing budgetary finance system and state medical institutions as a function of the type of care rendered and the contingent of clients served
- create a fiscal service along the lines of a tax inspectorate for ensuring timely and complete collection of funds for mandatory insurance

That, of course, is certainly not a complete list of all the measures that are needed. The reform of health care and the introduction of medical insurance represent a problem of enormous complexity. The use of the most advanced foreign experience and the adherence to the most remarkable traditions may not lead to success of any kind if the features of the current situation are not taken into consideration. And everybody should remember that.

### **Russian Law on Sverdlovsk Anthrax Victim Compensation Criticized**

924C1318A Moscow *LITERATURNAYA GAZETA*  
in Russian, No 18, 29 Apr 92 p 2

[Article by Staff Correspondent Natalya Zenova: "Figure of Silence: Will the Story of Malignant Anthrax in the Urals Come to an End?"]

[Text] President B. Yeltsin has promulgated a Law "On the Improvement of Pensions for the Families of Citizens Who Died as a Result of Malignant Anthrax in Sverdlovsk in 1979."

Let us recall that our newspaper was the first to conduct its own investigation and draw the conclusion that the cause of the tragedy in Sverdlovsk was not "contaminated meat," as the official version had proclaimed for many years, but the discharge of bacteriological weapons (LG [*LITERATURNAYA GAZETA*], No 34, 1990, and No 39, 1991). Our colleagues from other publications reached a similar conclusion. Today, thanks to the efforts of our own country's press and the foreign press, the public at large has no doubts as to the military's involvement in the disaster; life is providing new confirmation of that, and now a law appears.

Yes, of course it is very good that the families that lost their breadwinners will receive monetary assistance—that was one of the goals of our articles. But why is it only "breadwinners" who are involved? And why will the money be paid out of the pension fund, rather than out of the Ministry of Defense's funds? If it is not to blame, and we are dealing with an ordinary epidemic, why does the president recall it after so many years—haven't we had enough of all manner of misfortunes in recent years?

No, what the law fails to state is itself confirmation of the fact that there is a guilty party, but he remains a "figure of silence."

Of course, we are far from criticizing the president directly for the law, since we realize that he did not compose these texts. Moreover, the law is not the conclusions of a government commission, and not a court decision. But it is our civic duty to recall once again that, despite all the assurances, a government commission has never been set up; that the procuracy remains silent to this day; and that the case that has received loud international response has never been brought to a conclusion. And that the "i" should be dotted.

**Accident at Khabarovsk Pumping Station**  
*LD3103175892 Moscow ITAR-TASS in English*  
*1126 GMT 31 Mar 92*

[Article by ITAR-TASS correspondent Anatoliy Vostokov]

[Text] Khabarovsk March 31 TASS—An accident which occurred today at a local pumping station claimed the

life of one man on duty. More than 100,000 cubic metres of unpurified wastes are now pouring into the Amur river. All this filth has reached the area of the waterworks, supplying the population with tap water. The danger of its bacteriological and virus infection is not ruled out. The basements of several buildings are flooded with sewage water due to the accident, which has deranged the city's pumping system.



**Homogeneity of Commercial Tick-Borne Encephalitis Virus (TBEV) 205**

927C0348A Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII* in Russian No 6, Jun 91 (manuscript received 26 Jan 89; in final form 12 May 90) pp 48-50

[Article by I.V. Kotykhov, I.P. Malchikova, N.N. Kiseleva and Yu.V. Fedorov, Tomsk Medical Institute; Scientific Research Institute of Vaccines and Sera, "Virion" Scientific Industrial Association, Tomsk; Scientific Research Institute of Viral Infections, Sverdlovsk; UDC 578.833.26.083.2]

[Abstract] Genetic homogeneity of TBEV 205, used for vaccine production, was assessed in order to better appreciate its stability as a reliable vaccine source.

Tissue culture cultivation on pig embryo kidney cells and chick embryo fibroblasts revealed considerable heterogeneity in the S marker. Depending on the cells employed, 65-67.3 percent of the plaques produced were large, 21-21.1 percent were medium in size, and 11.7-13.9 percent were small. Protamine sulfate and magnesium chloride also had variable effects: Incubation times to plaque appearance were shortened, and lower viral concentrations were detected; in addition, the counts of small and intermediate plaques increased. Replacement of agarose B for agar was without quantitative sequelae, but the plaque edges become more diffuse. Finally, isolates from the different types of plaques did not differ in immunogenicity, but those from the large plaques were more infectious in tissue culture trials. Figures 2; tables 1; references 9: 8 Russian, 1 Western.